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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,469	03/23/2004	Eiju Komuro	P06276-US	1711

21254 7590 04/20/2006

MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER

BUDD, MARK OSBORNE

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	10/806,469	KOMURO ET AL.	
	Examiner	Art Unit	
	Mark Budd	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-19 are rejected under 35 USC 103 (a) as being on patentable over Takeishi in view of Onishi. Takeishi in at least figures 2 and 11-13 teaches the structure of a piezoelectric all resonator which is chip mounted to a substrate using bumps #21. Takeishi does not explicitly provide a cover. However Onishi (note #18 in figure 4) teaches providing a housing to protect and shield a flip chip mounted piezoelectric resonator. Thus, for at least the purpose of providing mechanical and environmental protection for the piezoelectric resonator it would have been obvious to one of ordinary skill in the art to provide a housing for Takeishi. Note that Takeishi explicitly teaches (see column 3 lines 4-13) but the prior art typically uses a solder bumps having a diameter of several tens to 100 μm . This establishes the prior art air gap as being equal to the bump diameter plus the piezoelectric electrode thickness plus the substrate in electrode thickness. Since the thickness (diameter) of the solder bump can vary between 30 μm (several tens) to 100 μm prior to the assembly (assembly would reduce the height of the solder bumps) it is felt that this is a clear teaching of providing an air gap of less than 100 μm . It is also a clear teaching of providing a bump (electrically connected projecting portion) having a maximum diameter no larger than 150 μm . Attention is also drawn to column 11 lines 57-58 which designate a bump thickness for #21 as being 60 μm . Looking at figure 2, for example, is noted that the air gap to mention would be less than 60 μm plus the thicknesses of #32 (45 μm (column 11 lines 7-11) plus the thickness of #15 (5 μm) for a total thickness of about 110 μm being provided before compression bonding of the device. This would lead to a final thickness in the range of 100 μm . Regarding the air gap limitations of 25 μm and 50 μm there is nothing essentially critical disclosed for these dimensions in the original disclosure. If these dimensions were somehow critical they would have been included in the original set of claims. Since optimization of a no device (for example through routine experimentation) has long been held to the width of the scale expected of the routineer the provision of specific dimensions would have been obvious to one of ordinary skill in the art.

Re: applicant that's the examiner has withdrawn the rejections of claims 17 and 1835 USC 112. Applicants have stated that previous office actions have not addressed limitations of claims 2, 3, 14 and 16. This is not correct. The final office action (world-2-05) clearly pointed out that the solder ball used by the prior art were only 60 μm in diameter which is clearly less than the 150 μm claimed by applicant's regarding buffer

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layers note #7 and #18 in figure 4 of Onishi. While oh did he does not provide any specific dimentions for the gap between ceiling member #13 and the piezoelectric substrate #1, as noted at the previous office actions the selection of specific dimentions for optimization of a known structure is within the skill expected of the routineer. Since the gap is filled with a "burying material" it would obviously be advisable to keep this gap as small as possible so as to minimize the amount of adhesive needed to fill this area (saves money).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Budd whose telephone number is 571-272-2019.

The examiner can normally be reached on Monday-Thursday from 6 a.m. to 4 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Garrett Schuberg, can be reached on 571-272-2044 The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Mark Budd
Primary Examiner
Art Unit 2834